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| EXAMINER | |
|---|---|
| WILSON, MICHAEL H | |
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| 1794 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/562,722 | OKUDA ET AL. | |
| | Examiner | Art Unit | |
| | MICHAEL WILSON | 1794 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *30 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20051230; 20070831*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Oath/Declaration*

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

> The oath or declaration is defective because:
> It does not state that the person making the oath or declaration acknowledges the duty to disclose to the Office all information known to the person to be material to patentability as defined in 37 CFR 1.56.

Applicant cited duty to disclose as 1.56(a). Appropriate correction is required.

### *Information Disclosure Statement*

2. Reference AA (Fujii et al. US 2003/0040627) on IDS received 8/31/2007 is a duplicate reference considered in IDS received 12/30/2005.

### *Claim Objections*

3. Claim1-8, and 11 are objected to because of the following informalities:

The term “metal-complex compound” should be replaced by --metal complex--.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 6 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 6, the recitation of L1 and L2 as “each independently represented by any one of the structures” renders the claim indefinite. The options for L1 and L2 consist only of bidentate ligands making L1 and L2 necessarily a single structure (i.e. L1 and L2 is one pic or one acac), an L1 and L2 of different ligands (i.e. L1 is pic and L2 is acac) would be impossible. For the purposes of this action L1 and L2 are interpreted as together representing pic, sim, acac, or facac.

Claim 8 recites the limitation "said light emitting layer" in line 1. There is insufficient antecedent basis for this limitation in the claim. For the purposes of this action “said light emitting layer” is interpreted as to read said organic thin film layer is a light emitting layer.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-4, and 6-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Fujii et al. (US 2003/0040627 A1).

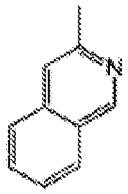
Regarding claim 1, Fujii et al. disclose a metal-complex compound having a partial structure represented by instant general formula (I) ([0018], formulae 3 to10). M is disclosed as preferably W, Re, Os, Ir, Pt, or Au [0038]. A specific example of instant general formula (I) is chemical formula 55 and 56 (page 7).

Regarding claim 2, Fujii et al. disclose all the claim limitations as set forth above. Additionally the reference discloses the metal complex of instant formula (I) which is a material for a light emitting element [0010].

Regarding claims 3 and 4, Fujii et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein said Structure B represents a substituted benzene ring represented by the formula:

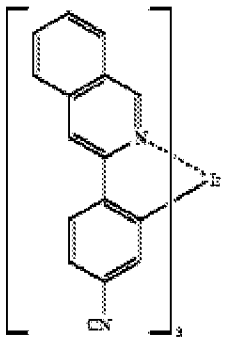

(page 7, Chem. Form. 55)

and wherein said Structure A represents a group represented by the following formula:



(page 7, Chem. Form. 55)

Regarding claim 6, Fujii et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein metal complex of instant formula (I) which is expressed by instant general formula (3):



(page 7, Chem. Form. 55)

Regarding claims 7 and 8, Fujii et al. disclose all the claim limitations as set forth above. Additionally the reference discloses an organic electroluminescence device which comprises at least one organic thin film layer sandwiched between a pair of electrode consisting of an anode and a cathode [0032], wherein the organic thin film layer comprises the metal complex of instant formula (I) [0031], which emits light by applying an electric voltage between the pair of electrode [0082], and wherein said light emitting layer comprises said metal complex [0031].

Regarding claim 11, Lamansky et al. disclose all the claim limitations as set forth above. Regarding the method limitations recited in claim 11 the examiner notes that even though a product-by-process is defined by the process steps by which the product

is made, determination of patentability is based on the product itself. *In re Thorpe*, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). As the court stated *in Thorpe*, 777 F.2d at 697, 227 USPQ at 966 (The patentability of a product does not depend on its method of production. *In re Pilkington*, 411 F.2d 1345, 1348, 162 USPQ 145, 147 (CCPA 1969). If the product in a product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.). Therefore the claim is anticipated for the reasons set forth above.

8. Claims 1-4, 6-8, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Lamansky et al. (US 2002/0182441 A1).

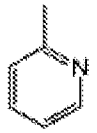
Regarding claim 1, Lamansky et al. disclose a metal-complex compound having a partial structure represented by instant general formula (I) wherein M is Pt and R2 is CN [0117].

Regarding claim 2, Lamansky et al. disclose all the claim limitations as set forth above. Additionally the reference discloses the metal complex of instant formula (I) which is a material for a light emitting element ([0013] and [0118]).

Regarding claims 3 and 4, Lamansky et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein said Structure B represents a substituted benzene ring represented by the formula:

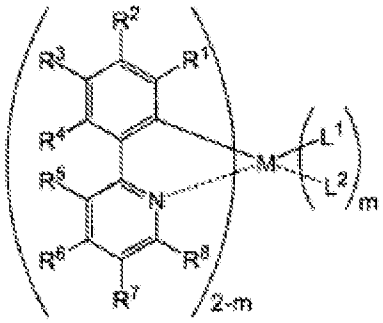

[0117]

and wherein said Structure A represents a group represented by the following formula:



[0117]

Regarding claim 6, Lamansky et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein metal complex of instant formula (I) which is expressed by instant general formula (5):



wherein M is Pt, R2 is CN, R1 and R3-8 are hydrogen, and m is 1 [0117]. L1 and L2 is acac, which is taught as an equivalent structure with pic [0103].

Regarding claims 7 and 8, Lamansky et al. disclose all the claim limitations as set forth above. Additionally the reference discloses an organic electroluminescence device which comprises at least one organic thin film layer sandwiched between a pair of electrode consisting of an anode and a cathode [0118], wherein the organic thin film layer comprises the metal complex of instant formula (I) [0118], which emits light by applying an electric voltage between the pair of electrode [0142], and wherein said light emitting layer comprises said metal complex [0118].

Regarding claim 11, Lamansky et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein said organic thin film layer comprising the metal complex is formed by coating, specifically spin coating [0118].

9. Claims 1, 2, 4, 6-8, and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Ma et al. (US 2004/0086742 A1).

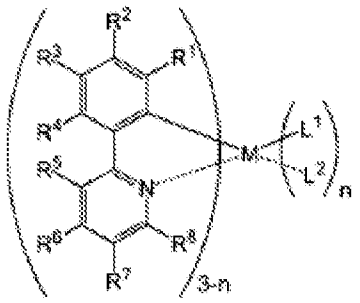
Regarding claim 1, Ma et al. disclose a metal-complex compound having a partial structure represented by instant general formula (I) ([0040], formula 2). M is disclosed as preferably Ir, Pt, [0041]. A specific example of instant general formula (I) is formula 7 (page 7).

Regarding claim 2, Ma et al. disclose all the claim limitations as set forth above. Additionally the reference discloses the metal complex of instant formula (I) which is a material for a light emitting element (abstract).

Regarding claim 4, Ma et al. disclose all the claim limitations as set forth above. Additionally the reference discloses said Structure A represents a group represented by the following formula:


([0055], formula 7, page 7)

Regarding claim 6, Ma et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein metal complex of instant formula (I) which is expressed by instant general formula (3):



wherein M is Ir, R3 is CN, and n is 0 or 1([0055] formula 7, page 7; and compounds 10 and 11, table1 page 10). L1 and L2 represent pic (compound 10, table 1, page 10).

Regarding claims 7 and 8, Ma et al. disclose all the claim limitations as set forth above. Additionally the reference discloses an organic electroluminescence device which comprises at least one organic thin film layer sandwiched between a pair of electrode consisting of an anode and a cathode (abstract), wherein the organic thin film layer comprises the metal complex of instant formula (I) (abstract), which emits light by applying an electric voltage between the pair of electrode [0004], and wherein said light emitting layer comprises said metal complex (abstract).

Regarding claim 11, Ma et al. disclose all the claim limitations as set forth above. Regarding the method limitations recited in claim 11 the examiner notes that even though a product-by-process is defined by the process steps by which the product is made, determination of patentability is based on the product itself. *In re Thorpe*, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). As the court stated *in Thorpe*, 777 F.2d at 697, 227 USPQ at 966 (The patentability of a product does not depend on its method of production. *In re Pilkington*, 411 F.2d 1345, 1348, 162 USPQ 145, 147 (CCPA 1969). If the product in a product-by-process claim is the same as or obvious from a product of

the prior art, the claim is unpatentable even though the prior product was made by a different process.). Therefore the claim is anticipated for the reasons set forth above.

### *Claim Rejections - 35 USC § 103*

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

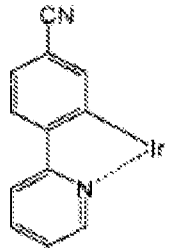
11. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. (US 2003/0040627 A1) as applied to claim 1 above.

Regarding claim 5, Fujii et al. disclose all the claim limitations as set forth above.

While the reference does not disclose a specific compound having a partial formula:




The reference discloses several ligand structures (rings A and B), including 2-phenylpyridine, which are suitable for use in the complexes of Fujii et al. [0041]. Further general formulae (3) through (10) disclose phenyl bound to a heteroaromatic ring A (page 2), several examples teach that ring A may be pyridine (chemical formulae 45-48, 52 and 53). Therefore such a compound would be obvious to one of ordinary skill in the art at the time of the invention. One of ordinary skill would reasonable expect a complex bearing a 2-(4-cyano-phenyl-1-yl)pyridine ligand would have similar properties and be suitable for the some purpose given that such a complex is within formula (7) or (8) and the numerous examples of phenylpyridine ligands disclosed. One of ordinary skill would be motivated to select the specific ligand by the specific effects the ligand has on the properties of the overall complex.

13. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. (US 2003/0040627 A1) as applied to claim 7 above and in view of Hirai et al. (US 2001/0028962 A1).

Regarding claims 9 and 10, Fujii et al disclose all the claim limitations as set forth above. However the reference does not explicitly disclose wherein an electron transporting layer with a $\pi$-electron lacking heteroring derivative having a nitrogen atom

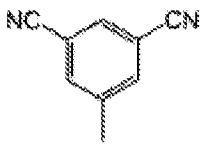
as its essential component sandwiched between said light emitting layer and said cathode; and wherein a reductive dopant is added in an interfacial region between said cathode and said organic thin film layer.

Hirai et al. teach an a similar organic electroluminescent device with an electron transporting layer with a $\pi$-electron lacking heteroring derivative having a nitrogen atom as its essential component [0054] sandwiched between said light emitting layer and said cathode [0054]. The reference also teaches an electron injection layer of LiF (reductive dopant) between the cathode and electron transport layer [0054].

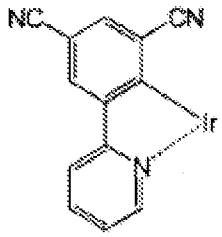
It would be obvious to one of ordinary skill in the art at the time of the invention to combine the electron transport and injection layers of Hirai et al. with the device of Fujii et al. One of ordinary skill in the art would recognize that the layers of Hirai et al. would be suitable for the device of Fujii et al. given that Fujii et al. teach the layers for use in a similar electroluminescent device, and one of ordinary skill in the art would be motivated by a desire to improve electron injection into the luminescent layer.

14. Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al. (US 2004/0086742 A1) as applied to claim 1 above.

Regarding claims 3 and 5, Ma et al disclose all the claim limitations as set forth above. While the reference does not explicitly disclose a complex with Structure B represented by the formula:



Or having a partial formula:




However such structures would be obvious to one of ordinary skill in the art at the time of the invention. Ma et al. disclose cyano as preferred for the R3 position [0055]. R5 is disclosed as being an electron withdrawing group if a blue emitting compound is desired [0044]. Cyano is a well known electron withdrawing group. Therefore it would be obvious to use cyano in the R3 and R5 positions. One of ordinary skill would be motivated to use cyano in both positions by the desire to blue shift the emission. One of ordinary skill would reasonably expect success given that Ma et al. teach a blue shift as the result of using electron withdrawing groups is the R3 and R5 positions ([0052]-[0053]).

## *Conclusion*

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Adachi et al. (WO 02/15645 A1) discloses a compound of instant formula (I) for use in an electroluminescent device.

Bach et al. (WO 03/084972 A1) disclose compounds of general formula (I) with a CN is the R3 position for use in an electroluminescent device.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL WILSON whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on (571) 272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

17. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MHW

/Callie E. Shosho/
Supervisory Patent Examiner, Art Unit 1794